PLink-AI

AI Computing Platform

11D2E2

Datasheet

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Data 2024-10-15

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Document History

Version	Date	Description of Change	Hardware Version
V 1.0	2024-10-15	Initial release	V 1.0

Hardware Update History

Versin	Date	Description of Change
V 1.0	2024-10-15	Initial release

Electronic components and circuits are very sensitive to electrostatic discharge, although the company will design the main interface on the board card to do anti-static protection design, but it is difficult to do anti-static safety protection for all components and circuits. Therefore, it is recommended that you take ESD safety measures when handling any circuit board component.

ESD safety measures include but are not limited to the following:

1. Put the card in an ESD bag during transportation or storage. Do not take out the card until installation and deployment.
2. Before touching the board, release the static electricity stored in the body: Wear a grounding wrist strap.
3. Operate circuit boards only in electrostatic discharge safe areas.
4. Avoid moving circuit boards in carpeted areas.
5. Avoid direct contact with electronic components on the board through edge contact.

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Introduction

11D2E2 AI Computing Platform (referred to as 11D2E2) is compatible with NVIDIA Jetson Orin NX/Orin Nano core modules. It can provide up to 100 TOPS of computing power and has a rich set of external interfaces. The internal interface devices are all wide-temperature models.

11D2E2 can be expanded through the built-in miniPCIe interface, M.2 interface, such as SSD storage card, 4G/5G communication module, various video capture/output cards, AD collection card, multi-serial port card, audio collection/output card, multi-function IO card, etc.

11D2E2 can support up to 4 GMSL/GMSL2 camera module interfaces (GMSL is an optional function, not standard. Please contact our company for GMSL camera models compatible with this product). It reserves the optical isolation IO interface to support 24V DC power input and output. It can be expanded to support POE gigabit network, compatible with industrial automation, vehicle-road coordination and other scene requirements.

Specifications

	Feature
Y-C11	Develop carrier board
Module	NVIDIA Jetson Orin NX / Orin Nano Module
Temperature	-20 ~ +65℃
Dimensions (W×D×H)	190.30mm * 180.50mm * 75.30mm (Including I/O ports and mounting holes)
Weight	1603g

Power Supply	Spec
Input Type	DC
Input Voltage	+12 V ~ +24V

Interface	Quantity	Interface	Quantity
USB3.0 Type-A	4	Micro USB	1
RJ45	2	HDMI	1
RS232(DB9)	2	RS485(DB9)	2
CAN	1	SIM Card Slot	1
Opto-Isolated GPI (24V)	4	Opto-Isolated GPO (24V)	4
GMSL	2/4 (GMSL is an optional function, not standard.)		
*RJ45 The POE power supply function is optional. Only external POE power is available. By default, the POE function is not enabled.			

NVIDIA Jetson Series Modules Technical Specifications

Module	Jetson ORIN NX 16GB	Jetson ORIN NX 8GB	Jetson Orin Nano 8GB	Jetson Orin Nano 4GB
AI Performance	100 TOPS	70 TOPS	40 TOPS	20 TOPS
GPU	1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores		1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores	512-core NVIDIA Ampere architecture GPU with 16 Tensor Cores
CPU	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3	6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3	6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3	
Memory	16GB 128-bit LPDDR5 102.4GB/s	8GB 128-bit LPDDR5 102.4GB/s	8GB 128-bit LPDDR5 68 GB/s	4GB 64-bit LPDDR5 34 GB/s
Storage	Support external NVME		Support external NVME	
Video Encode	1x 4K60 (H.265) 3x 4K30 (H.265) 6x 1080p60 (H.265) 12x 1080p30 (H.265)		1080p30 supported by 1-2 CPU cores	
Video Decode	1x 8K30 (H.265) 2x 4K60 (H.265) 4x 4K30 (H.265) 9x 1080p60 (H.265) 18x 1080p30 (H.265)		1x 4K60 (H.265) 2x 4K30 (H.265) 5x 1080p60 (H.265) 11x 1080p30 (H.265)	
Power	10W - 25W	10W - 20W	7W - 15W	7W - 10W

External I/O Ports

11D2E2 Front Ports

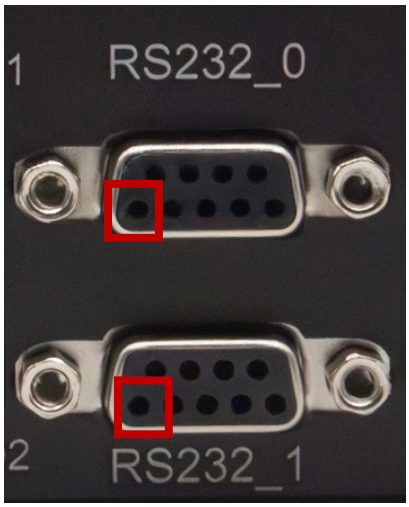
Sign	Function	Sign	Function
SIM	Micro SIM Card Slot	HDMI	Type-A HDMI
Gige1	RJ45 Jack(10/100/1000 BASE-T Ethernet)	Gige2	RJ45 Jack(10/100/1000 BASE-T Ethernet)
REC	Recovery Button	USB	USB 3.0 Type-A
DC12V	Power In（12V ~ 24V）	OTG	Micro USB(OTG)

11D2E2 Back Ports

Sign	Function	Sign	Function
M	GPI Input GND	N	GPO Output GND
I1/I2/I3/I4	Opto-Isolated GPIO Input	O1/O2/O3/O4	Opto-Isolated GPIO output
L	GPO output connected positive electrode（24V）	RS232_0	RS232 Serial Ports
RS232_1	RS232 Serial Ports	RS485_0	RS485 Serial Ports
RS485_1&CAN		RS485 Serial Ports, CAN	
GMSL		GMSL is an optional function, not standard	

Connector Description

GMSL		
Function	Connect to a GMSL camera via a GMSL coaxial cable.	
Sign	GMSL	
Type /Model	KH-FAK-K508-P	
Device Name	/dev/video* (The actual initialized device name after accessing the camera shall prevail. Please refer to more information: https://gitee.com/plink718/plink-gmsl-init/blob/master/README.en.md)	
Notice	GMSL is an optional function, not standard.	

DB9 Connector（RS232_0/RS232_1）		
Function	RS232 Serial Ports	
Sign	RS232_0/RS232_1	
Type /Model	DB9 Connector	
Pin definition	Pin 1： Red frame on the right picture	

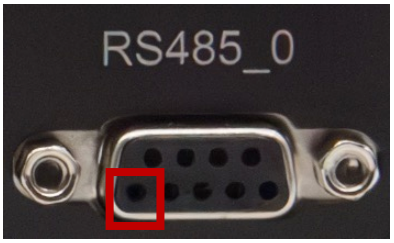
Pin	Signal	Pin	Signal
1	NC	2	RX_RS232
3	TX_RS232	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC	10	NC

Device Name		
	RS232_0	/dev/ttyWCH3
	RS232_1	/dev/ttyWCH2

DB9 Connector（RS485_0）

Function	RS485 Serial Ports
Sign	RS485_0
Type /Model	DB9 Connector
Pin definition	Pin 1： Red frame on the right picture
Device Name	/dev/ttyWCH0

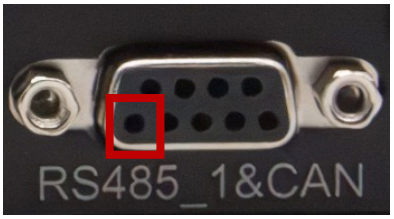
Pin	Signal	Pin	Signal
1	RS485-B	2	RS485-A
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC



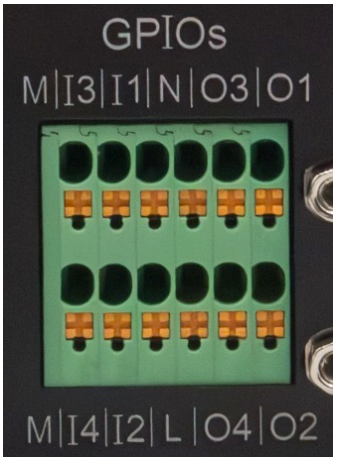
DB9 Connector（RS485_1&CAN）

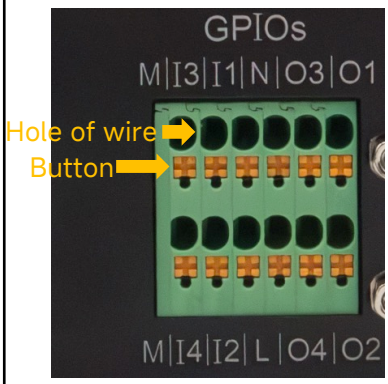
Function	RS485 Serial Ports, CAN
Sign	RS485_1&CAN
Type /Model	DB9 Connector
Pin definition	Pin 1： Red frame on the right picture
Device Name	/dev/ttyWCH1

Pin	Signal	Pin	Signal
1	RS485-B	2	RS485-A
3	NC	4	NC
5	NC	6	NC
7	CAN_H	8	CAN_L
9	NC	10	NC



Opto-Isolated GPIO

Sign	GPIOs	
Pin definition	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>M</td><td>GND</td><td>M</td><td>GND</td></tr><tr><td>I3</td><td>GPI3</td><td>I4</td><td>GPI4</td></tr><tr><td>I1</td><td>GPI1</td><td>I2</td><td>GPI2</td></tr><tr><td>N</td><td>GND</td><td>L</td><td>+24V</td></tr><tr><td>O3</td><td>GPO3</td><td>O4</td><td>GPO4</td></tr><tr><td>O1</td><td>GPO1</td><td>O2</td><td>GPO2</td></tr></table>The sequence of signal pins is shown in the screen print on the right.	
Notice	This interface is optocoupler isolated GPIO, GPI can only be used as input, GPO can only be used as output, does not have the ability of independent input and output, need external 24V power supply; M indicates the GND of the external power supply when GPI is input, N indicates the GND of the external power supply when GPO is output, and L indicates the external 24V power supply when GPO is output.	

<table>
<tr><th colspan="3">Opto-Isolated GPIO</th></tr>
<tr><td>Instructions</td><td colspan="2">Wire connection steps:
1. Press and hold the yellow button in the picture with the screwdriver.
2. Put the wire into the inlet.
3. Release the button.
Wire release steps:
1. Press and hold the yellow button in the picture with a screwdriver.
2. Pull out the wire from the inlet.
3. Release the button.
When using GPI, connect the negative terminal of the external 24V stabilized power supply to M and the positive terminal to the GPI port used.When using the GPO, connect the positive terminal of the external 24V regulated power supply to L and the negative terminal to N, and the GPO can output 24V or lower.Check the GPI input status, or set the GPO output status, please refer to the sample program:https://gitee.com/plink718/11D2E2-io-test</td><td> 
</td></tr>
<tr><td>Device Name</td><td colspan="2">/dev/plink-gpios（The current interface needs to refer to the example program to control the mapping file name）</td></tr>
</table>

Order Information

Type	Description
11D2E2	Ai computing platform for NVIDIA® Jetson™ ORIN NX/ORIN Nano series core modules
If you need to add other functional modules, please confirm the plan with the company's sales and technical personnel in advance.	

Recovery Mode

Jetson core module can work in normal mode and Recovery mode. In Recovery mode, it can perform file system update, kernel update, Bootloader/UEFI update, BCT update and other operations.

To enter the Recovery mode, perform the following steps:

1. Power off the system.
2. Use a Micro-USB cable to connect the Micro-USB port (OTG) of the 11D2E2 to the Jetson development host USB port.
3. The Jetson development host should be Ubuntu18.04 or Ubuntu20.04 based on X86 architecture.
4. Press the Recovery key (REC) to power the system. Hold down the Recovery key (REC) for more than 3 seconds, and then release the Recovery key (REC).
5. When the system enters Recovery mode, you can perform subsequent operations.

Method of Application

- Make sure all external system voltages are off.
- Install necessary external cables. (such as: the display line connected to the HDMI display, the power input line for the system power supply, the USB cable connecting the keyboard and mouse...)
- Connect the power cord to the power supply.
- 11D2E2 The system powers on automatically by default. It can also be set as a switch start, for specific methods, please consult the company's sales and technical personnel.

CAN Test

The 11D2E2 is equipped with 1 CAN, You need to connect an external CAN device to test, connect the CAN_H of the device to the CAN_H

The test commands is as follows:

- sudo apt-get install busybox can-utils

Writes the specified value to a register

- sudo busybox devmem 0x0c303018 w 0xc458
- sudo busybox devmem 0x0c303010 w 0xc400
- sudo modprobe can #Load the CAN bus subsystem support module
- sudo modprobe can_raw #Load the original CAN protocol module.
- sudo modprobe mttcan #LoadCAN interface support
- sudo ip link set can0 type can bitrate 500000 #Set CAN0 bitrate to 500k bps
- sudo ip link set up can0 #Open CAN0
- candump can0 #Set CAN0 to recvive
- cansend can0 1F223344#1122334455667788
  #Set CAN0 send data

RS232 Test

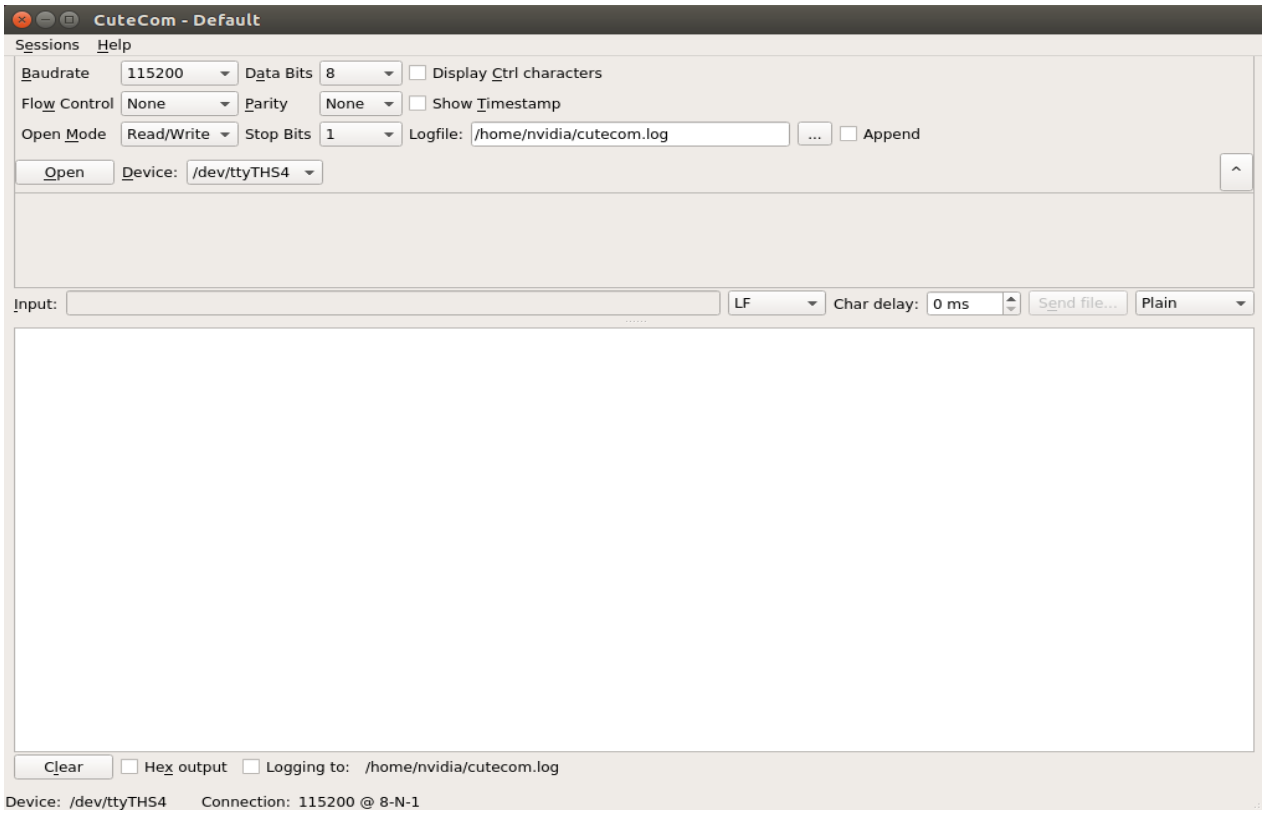
The 11D2E2 is equipped with two RS232 serial ports as standard，which can be used for self-receiving test of a signal serial port, and connection of two RS232 serial ports for docking test. The command is as fllows：

sudo apt-get install cutecom #install the serial port test tool

sudo cutecom

When testing a single serial port, connect the RX of a single serial port to the TX. When two serial ports are connected, the RX of COM1 is connected to the TX of COM2, and the TX of COM1 is connected to the RX of COM2.

The interface of the serial port test tool cutecom is as follows:



RS485 Test

The 11D2E2 is equipped with two RS485 serial ports as standard. You can connect two RS485 serial ports for interconnection test.

Because RS485 needs to be set when it is used, only the example program can be used for testing.

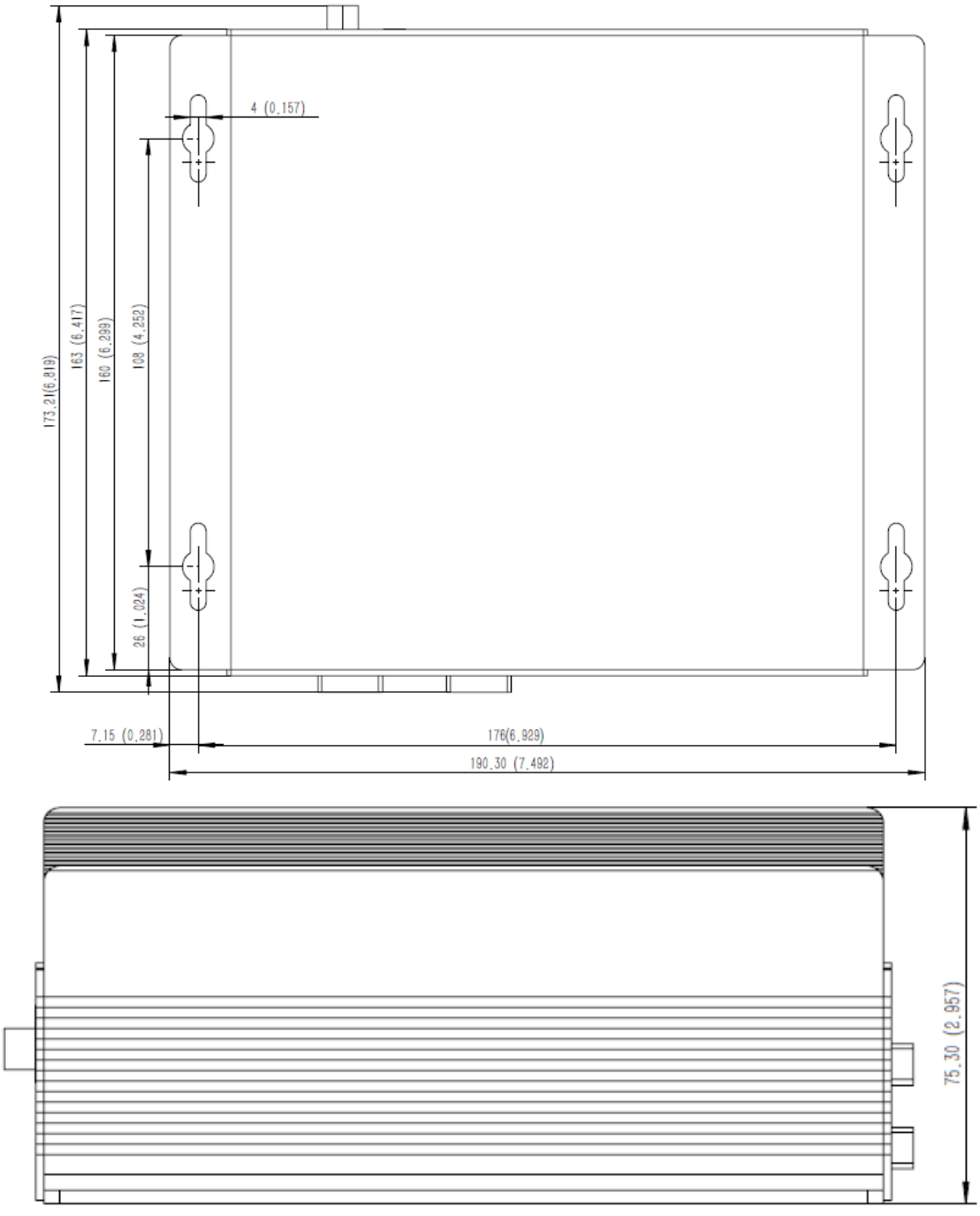
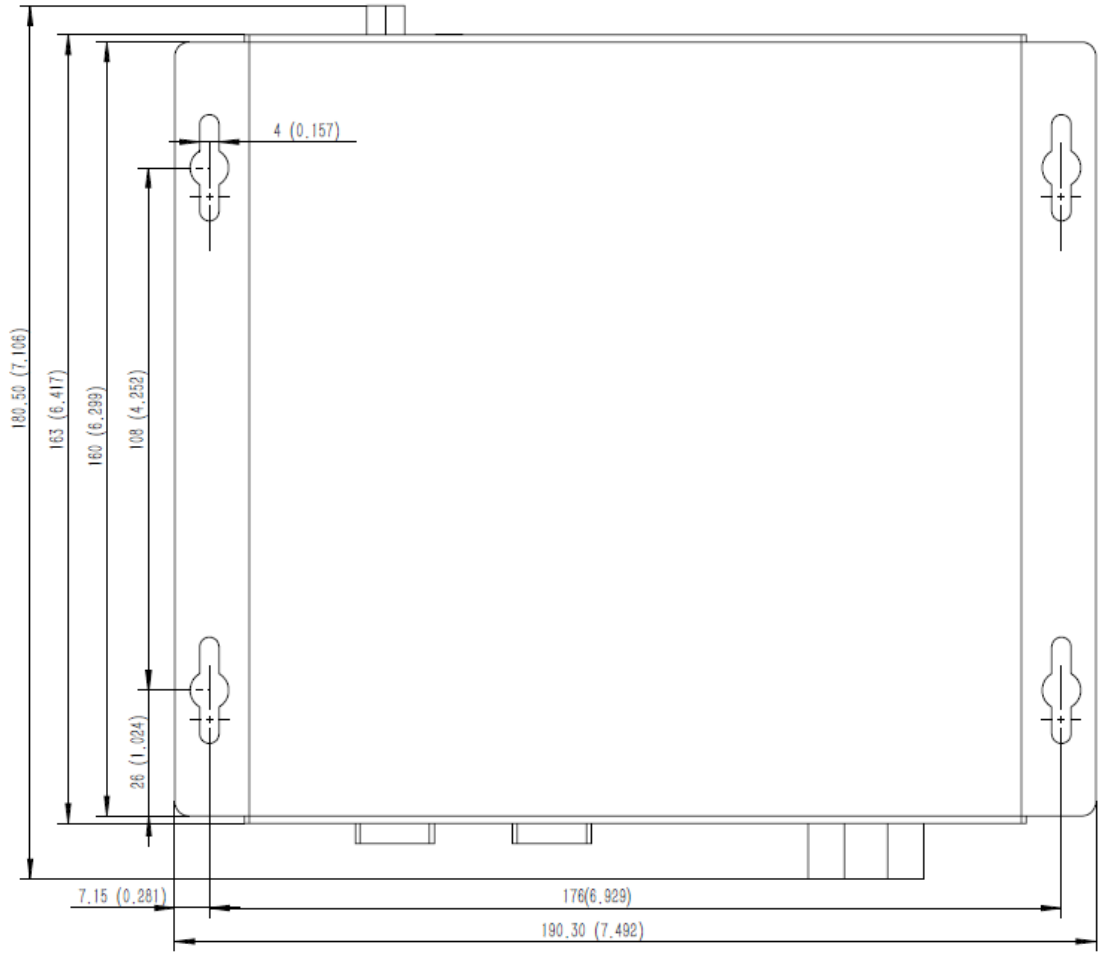
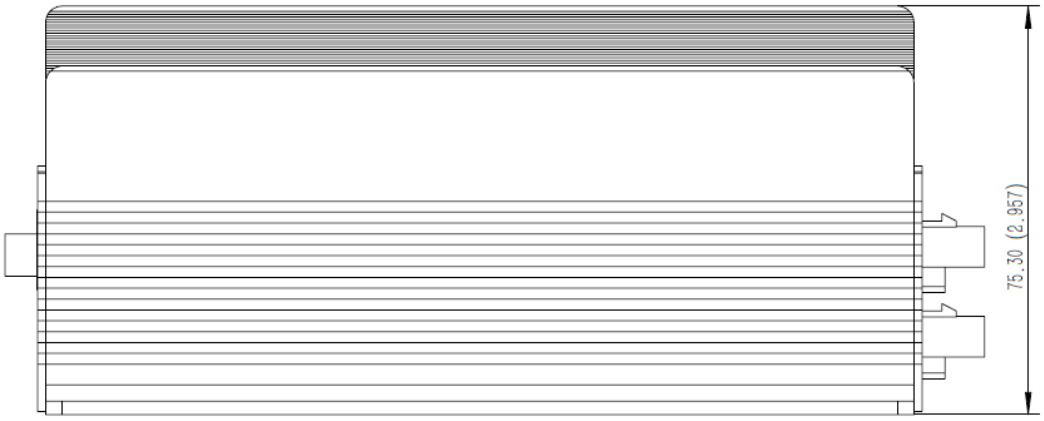
Demo download link： https://gitee.com/plink718/11D2E2-io-test

The sample program can also be used to test the RS232 serial port. Please refer to the README in the above link for the sample program usage.

Special Instructions

- Initial system user name: nvidia, password: nvidia, no password su. If root permissions are required, use sudo to grant permissions, or use sudo su to access the root user.
- The pre-installed system is pure by default and does not contain Jetpack software. You can use the following command to install the software. Do not replace or modify the default software source before installation:
- sudo apt-get update
- sudo apt-get install nvidia-jetpack
- It can also be installed over the network using SDKmanager software.
- For more information please refer to: Jetson wiki (plink-ai.com)

Mechanical Dimensions



GMSL Mechanical Dimensions